TIME

How the Company Behind TikTok's Viral 3D-Printed Houses Wants to Help Solve the Affordable Housing Crisis

Watching a giant robotic arm methodically deposit layers of concrete may not sound like a transfixing experience. But on TikTok, videos of this exact process—otherwise known as 3D printing—are racking up tens of millions of views and helping people envision a world in which affordable 3D-printed houses are the new norm.

Known as @thelayerlord on TikTok, Aiman Hussein has gained nearly 50,000 followers since joining the social platform last year to showcase the work of Alquist 3D, where he's the director of printing. His TikToks revolve around the process of 3D printing houses, with his most-watched videos showing how Alquist's printers systematically layer row after row of concrete to build up a home's exterior walls in a computer-generated pattern.

Just like smaller-scale 3D printers, Alquist's machines have a dispenser that pumps out layers of material—in this case, concrete—on top of each other, to construct a physical object. They follow a predetermined layout to form the design provided by a digital file. The process can be used to create anything from jewelry to furniture to the walls of a house.

Hussein says he started out taking his videos to document the company's work, but realized that something about them resonated with people on TikTok. "It's an oddly satisfying process that we do here," he says.

Viewers often leave jokey comments like "forbidden soft serve" and "I can't even get toothpaste to come out that smooth" on Hussein's posts, the most popular of which have been watched nearly 20 million times. However, others have questions. "I mean it's handy but how long does it take to build a house," one user commented on an August post that garnered over 16 million views. (Answer: an average of 20-30 hours).

But despite the growing potential of the 3D-printed homebuilding industry, challenges still exist that could hamper its mainstream expansion. For one thing, demand is very high but availability is extremely limited.

What is the current state of the 3D-printed home industry?

Since it was founded in 2020, Alquist has completed two 3D-printed house builds, one in Williamsburg, Va., and one in Richmond, Va. The idea of 3D-printed houses has also been gaining popularity in recent years. A survey published by Realtor.com in August 2021 found that 66% of consumers would consider living in a 3D-printed home. That number was even higher among younger generations, with 75% of millennials saying they'd be open to 3D-printed living accommodations. Around a third of respondents also said they believe that 3D printing is the future of homebuilding and will eventually come to replace more traditional methods.

Zachary Mannheimer, founder and CEO of Alquist, says that one of the biggest benefits of 3D printing is that it produces houses that are affordable, energy-efficient, and customizable.

Alquist is seeing cost savings of 15% for 3D-printed homes compared to traditional stick-built homes—i.e., homes that are built on site using a wooden frame. The company's goal is to increase cost savings to 30% by 2023, Mannheimer says.

In December, a Virginia family moved into the first 3D-printed Habitat for Humanity home in the U.S, built by the company. The concrete exterior of the 1,200-square-foot home was constructed in just 22 hours—around two-three weeks quicker than the standard construction schedule—and resulted in a three-bedroom, two-bathroom house.

"There's nothing different about one of our homes versus any other home except that the exterior walls are made out of concrete instead of wood. These homes are built nearly identically otherwise," Mannheimer says. "Our process just involves extruding concrete from a giant robot, which gives you savings in time and labor and material."

Through Habitat for Humanity's homebuyer program, the family living in Alquist's first owner-occupied 3D-printed home is responsible for monthly mortgage payments that are no more than 30% of its income, including real estate taxes and homeowner's insurance.

"Working with Habitat for Humanity was a fantastic experience. They were very like-minded and driven to drop costs down on all their structures," Hussein says. "It really showed how we can fulfill that mission statement of getting people into homes they can afford."

Mannheimer says that since the news of the Habitat home broke, Alquist has seen a big increase in requests, showing just how much demand there is for more affordable housing. "Since the home was completed and the first story about it came out, we've been averaging anywhere between 25-50 requests for 3D-printed homes per hour," he says. "So it has confirmed all our beliefs about why this is so important. The need is huge."

Following the success of its first two 3D-printed homes, Alquist is working on a new project related to affordable housing, to be announced at the end of April.

What challenges are 3D printing construction companies facing?

With the White House estimating that the U.S. has a shortage of as many as 4 million affordable housing units, the problem goes beyond anything that a viral TikTok could solve on its own. The biggest challenge currently facing the 3D-printed housing industry is scale, says Mannheimer: "At the moment, there's less than 10 companies using this technology in America. To really make a dent in the affordable housing crisis, we'd need more like 50."

But some experts say there are other fundamental issues holding 3D printing back from revolutionizing housing. Ryan Smith, director of the School of Design and Construction and a professor of architecture at Washington State University, says that while 3D printing has long-term potential to transform the construction industry, America's penchant for building houses with light wood framing is a major challenge for wider implementation of tech that relies on concrete.

Since labor and supply chains in the U.S. are set up to handle wood, Smith says that trying to upend the current system would create considerable logistical obstacles for the installation and repair of plumbing, electricity, HVAC and other systems. "If you change the means and methods of construction from a lightweight frame to concrete-based housing, you would have to develop a whole workforce around that to be able to manage it," he says.

Rather than trying to replace existing wall construction methods with 3D printing, Smith says companies should produce components of a house in a factory setting before assembling them at a homebuilding site. "You can embed mechanical, electrical, and plumbing much more easily in a factory than you can at the job," he says.

Some other housing companies already do this.

How TikTok is fueling the 3D printing hype

All of those hurdles mean that, for now, affordable 3D-printed homes aren't going mainstream anytime soon. But building interest is the first step, Mannheimer says. "The videos are getting views because they're so satisfying to watch," he says.

For members of younger generations facing a difficult path to home ownership, it's a compelling fantasy.

"It starts to unlock your imagination for what else is possible, " he says. "We can excite a whole new generation about building things with computers and machines instead of shovels."